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jc712 U.S. PTO

PATENT  
Attorney Docket No. JA9-98-171  
Client/Matter No. 41080 830003.000  
EXPRESS MAIL NO. EL415726121US

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09/439264  
US TO

IN THE U.S. PATENT AND TRADEMARK OFFICE

Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

This is a request for filing a \_\_\_\_\_ Non-Provisional Original  Utility \_\_\_\_\_ Design Patent Application, \_\_\_\_\_ Continuation \_\_\_\_\_ Divisional \_\_\_\_\_ Continuation-in-Part Application under 37 CFR 1.53(b), of pending prior Japanese application No. 10-324169 filed on November 13, 1998 by KUNIHIKO MIWA, TAKUJI MATSUSHIBA and KAZUYOSHI TANAKA for METHOD AND APPARATUS FOR CONTROLLING DIGITAL DATA which is a \_\_\_\_\_ Application of prior application Serial No. \_\_\_\_\_ by for, from which priority is claimed.

Enclosed are:

An original specification, claims, drawings and Declaration and Power of Attorney.  
 A replacement Specification and claims.  
\_\_\_\_ A preliminary amendment is enclosed to be entered in the new application after a filing date has been granted.  
\_\_\_\_ New formal drawings are enclosed.  
\_\_\_\_ A List of References.

The filing fee is calculated below based on replacement specification and claims:

The filing fee is calculated below:

FOR:	(Col. 1)	(Col. 2)
BASIC FEE		
TOTAL CLAIMS	20 - 20 =	* 0
INDEP CLAIMS	6 - 3 =	* 3
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENTED		

\*If the difference in Col. 1 is less than zero, enter "0" in Col. 2.

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x130 =	\$
TOTAL	\$

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OR	x18 =	\$ 0
OR	x78 =	\$ 234
OR	+260 =	\$ 0
OR	TOTAL	\$ 994

A check in the amount of \$ 994.00 is enclosed.

Please charge Deposit Account No. 08-2623 in the amount of \$ \_\_\_\_\_.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Account No. 08-2623.

The PTO did not receive the following  
listed item(s) a check for \$ 994.00.  
But check for \$ 1074.00 is enclosed.

The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 08-2623. A duplicate copy of this sheet is attached.

Any filing fees under 37 CFR 1.16 for the presentation of extra claims.

Any patent application processing fees under 37 CFR 1.17.

Cancel claims \_\_\_\_\_.

Priority under 35 U.S.C. 119 is claimed on the basis of prior Japanese application No. 10-324169 filed on November 13, 1998. A certified copy of this foreign application is enclosed.

Amend the specification by inserting before the first line the sentence:

—This is a \_\_\_\_\_ continuation \_\_\_\_\_ division of co-pending application Serial No. \_\_\_\_\_, filed on \_\_\_\_\_.

The prior application is assigned to \_\_\_\_\_.

The power of attorney in the prior application is to:

Francis A. Sirr, Reg. No. 17,265, Earl C. Hancock, Reg. No. 19,472, Stuart T. Langley, Reg. No. 33,940, Lee R. Osman, Reg. No. 38,260, James A. Pinto, Reg. No. 40,774, Robert G. Crouch, Reg. No. 34,806, Robert H. Kelly, Reg. No. 33,922, Patrick T. McBride, Reg. No. 39,295, and Brian P. Kinnear, Reg. No. 43,717.

a.  The power appears in the original papers of the prior application.

b.  Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.

c.  Recognize as associate attorney and address all future communications to:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

A verified statement that this filing is by a small entity:

is attached.

has been filed in the parent application and such status has been re-determined and is still proper and desired. (37 C.F.R. 1.28(a)).

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Dated this 12<sup>th</sup> day of November, 1999.

Respectfully submitted,

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PATENT  
Attorney Docket No. JA9-98-171  
Client/Matter No. 41080.830003.000  
EXPRESS MAIL NO. EL415726121US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: )  
KUNIHIKO MIWA, TAKUJI )  
MATSUSHIBA and KAZUYOSHI )  
TANAKA )  
 ) Group Art Unit: \_\_\_\_\_  
Serial No. \_\_\_\_\_ )  
 )  
Filed: Herewith )  
 )  
For: METHOD AND APPARATUS FOR )  
CONTROLLING DIGITAL DATA )  
\_\_\_\_\_ ) Examiner: \_\_\_\_\_

CERTIFICATE OF MAILING BY EXPRESS MAIL

Box PATENT APPLICATION  
Assistant Commissioner  
for Patents  
Washington, D.C. 20231

Sir:

The undersigned hereby certifies that the following documents:

1. Transmittal Letter for Patent Application
2. Utility Patent Application and Replacement Specification and Claims
3. Executed Combined Declaration and Power of Attorney
4. 9 sheets of drawings
5. Recordation Form Cover Sheet PTO 1595 with Executed Assignments and Recording Fee of \$40.00 (2)
6. \$994.00 filing fee
7. Certified Copy of Japanese Application No. 10-324169
8. Return postcard
9. Certificate of Mailing

relating to the above application, were deposited as "Express Mail", Mailing Label No. EL415726121US with the United States Postal Service, addressed to Box PATENT APPLICATION, The Assistant Commissioner for Patents, Washington, D.C., 20231, November 12, 1999.

November 12, 1999  
Date

Earl C. Hancock  
Mailer

12 NOVEMBER 1999  
Date

9-20-4  
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## REPLACEMENT SPECIFICATION

## CLAIMS AND ABSTRACT

METHOD AND APPARATUS FOR CONTROLLING DIGITAL DATA

FIELD OF THE INVENTION

5

This invention relates to a technique for embedding additional information (digital watermark) into digital contents for copyright protection thereof, whereby a video recorder, a player or the like may detect such embedded additional information for use in control (management) of recording and playback of such digital contents. More specifically, this invention relates to a method and an apparatus which use the digital watermarking and scrambling (or encrypting) techniques, for controlling recording and playback of such digital contents.

BACKGROUND OF THE INVENTION

20

As one of the methods of providing the safest and powerful control function for copyright protection of digital data, there is the access control method of data that uses the so-called digital watermarking. Digital watermarking is a technique for electronically embedding additional information into digital data (contents). Such additional information is embedded through a transformation of data itself.

30

That is, digital data and additional information are unified or integrated together and, thus, it is difficult to separate the one from the other. In this respect, Japanese Patent Application 8-273551 discloses a prior technique for performing access control of data using this digital watermarking. More particularly, in Japanese Patent Application 8-273551, an additional information detector (digital watermark detector) is provided in a drive such as DVD for detecting such additional information from various MPEG (Motion Picture Experts Group) streams and for performing access control using the same.

Fig. 1 shows its schematic configuration. An STB (Set-Top Box) 110 supplies signals, which may be in analog or digital form, to a video recorder 120. In the 5 case of feeding an MPEG stream from the STB 11, this MPEG stream is directly sent to the additional information detector in the video recorder 120. On the other hand, if an output of the STB 110 is in analog form, this 10 analog output is sent to an MPEG encoder in a video driver card for converting it into a digital signal, which is then sent to the additional information detector.

This additional information detector detects any 15 additional information and copy mark information embedded in the contents and, in accordance with the information, performs a variety of predetermined controls with respect to the video recorder 120 and a playback machine (player) 130. By way of example, the following items of control 20 are performed.

In a recording device, detection of a digital watermark is performed and, based on this, the following copying control operations are performed (note that a 25 symbol "CM" below stands for a copy mark):

(1,0) and absence of CM: Add a CM and passes the stream (authorize or permit video recording).  
 (1,0) and presence of CM: Stop the stream or video recording.  
 30 (1,1) : Stop the stream or video recording.  
 (0,0) or absence of detected additional information: Permit video recording.

35 In a playback device, detection of a digital watermark is performed and, based on this, the following playback control operations are performed:

(1,0) and absence of CM: Prohibit playback.  
 (1,0) and presence of CM: Prohibit playback for a read-only disk, whereas permit playback for a write-once disk or a writeable disk.  
 40 (1,1) : Permit playback for a read-only disk, whereas prohibit playback for a write-once disk or a writeable disk.  
 (0,0) or absence of detected additional information: Permit playback.

provides some copying control techniques, as well as playback control techniques adapted for respective types of media. However, in accordance with this prior approach, it is necessary to provide the additional 5 information detector in a drive (i.e., in a recording device or a playback device). This is because, in order to secure copyright protection, it is mandatory to provide the additional information detector at the 10 reading nucleus of the video recorder 120, even though 15 the video recorder 120 has severe constraints on its cost and/or space.

Also, it is necessary to detect a digital watermark from a variety of MPEG streams, which should inevitably 15 lead to upsizing of the detector. Further, in order to know in the playback machine 130 that the current contents is a copied one, it is necessary to know information about types of the media (e.g., read-only, 20 write-once and writeable) that are subject to reading. Accordingly, what is needed is a new copyright protection 25 scheme using digital watermarking, which is free of the aforesaid problems.

#### SUMMARY OF THE INVENTION

It is, therefore, an object of this invention to 25 provide a method of controlling data copying or playback and an apparatus therefor, which do not require provision of an additional information detector in a drive that has 30 severe constraints on its cost and/or space.

It is another object of this invention to provide a 35 method of controlling data copying or playback and an apparatus therefor, which use an additional information detector of a smaller size.

It is yet another object of this invention to 40 provide a method of controlling data copying or playback and an apparatus therefor, which do not require knowledge of information about types of media for playback control.

It is yet another object of this invention to 45 provide a method of controlling data copying or playback and a system therefor, which use effectively combined digital watermarking and scrambling techniques.

To accomplish said objects, the recording control is performed as set forth below. First, from digital data, any additional information electronically embedded therein is detected and, if such additional information is detected, then access control of the digital data is performed using the additional information. Next, the digital data is scrambled for recording the same onto a medium.

5 Note that the term "electronically embedded additional information" means herein such additional information that is embedded through a transformation of the data itself. Also, the term "access control" means herein to determine whether copying/recording of the 10 digital data is to be stopped or continued. Depending on a content of the additional information, the term "access control" also embraces embedding of control information 15 such as a copy mark into the digital data.

20 Next, in case of playback control, the scrambled digital data is descrambled (or decrypted), thereby to detect any electronically embedded additional information and copy mark from the descrambled digital data. Using such detected information, playback control of the 25 digital data is performed.

The present invention relates to a method of recording digital data onto a medium starting with detection from digital data of any additional information 30 electronically embedded therein. If this additional information is detected, then access control is performed for the digital data using this additional information followed by scrambling the digital data and recording the 35 scrambled digital data onto a medium.

35 The method can include the step of determining whether copying/recording of the digital data is to be stopped or continued and can further include a step of embedding a copy mark into the digital data in accordance 40 with a content of the aforesaid additional information.

45 Playback control of digital data recorded onto a medium is performed by descrambling the scrambled digital data, detecting from the digital data any additional information and copy mark electronically embedded therein and performing playback control of the digital data using the additional information and copy mark. The electronically embedded additional information can

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comprise such additional information that is embedded through a transformation of the data itself.

5 The present invention further contemplates a video driver card for creating digital data which card includes an encoder for receiving analog data and outputting digital data along with detection of any additional information electronically embedded in the digital data. The card can include structure for adding a copy mark to 10 the aforesaid additional information in accordance with that additional information; and an arrangement for scrambling the digital data with the additional information. Where the digital data is an MPEG stream, the video driver card encoder is an MPEG encoder.

15 A video driver card of this invention for decoding digital data includes an arrangement for descrambling scrambled digital data along with an arrangement for detecting from the digital data any additional 20 information and copy mark electronically embedded therein. The driver card can include the capability of performing playback control of the digital data using the additional information and copy mark. Where the digital data is an MPEG stream, the driver card includes means 25 for determining whether or not outputting of an MPEG stream is to be performed and for outputting a desired MPEG stream.

30 The video driver card can further include means for adding a copy mark to the digital data in accordance with the additional information and copy mark and for outputting the digital data.

35 A recorder for recording digital data onto a medium in accordance with this invention employs an encoder for receiving analog data and outputting digital data along with a means for detecting any additional information electronically embedded in that digital data. This recorder is likewise capable of adding a copy mark to the 40 aforesaid additional information in accordance with the additional information. The recorder is further capable of scrambling the digital data and for recording the scrambled digital data onto a medium.

45 For digital data that is an MPEG stream, the encoder is an MPEG encoder. The electronically embedded additional information can comprise additional information that is embedded through a transformation of

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the data itself.

Another aspect of this invention is a player for playing back digital data recorded onto a medium. It is capable of reading and descrambling the digital data from the medium. It can detect from the digital data any additional information and copy mark electronically embedded therein and can perform playback control of the digital data using the additional information and copy mark. Where the digital data is an MPEG stream, the player can determine whether or not outputting of an MPEG stream is to be performed and for outputting a desired MPEG stream.

The electronically embedded additional information can comprise such additional information that is embedded through a transformation of the data itself. The player can also include the ability to add a copy mark to the digital data in accordance with the additional information and copy mark and for outputting the digital data.

The foregoing and other features, utilities and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention as illustrated in the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is a diagram showing a prior scheme for performing access control of data.

Fig. 2 is a schematic diagram showing an apparatus of this invention for performing recording and playback of digital data.

Fig. 3 is another schematic diagram showing an apparatus of this invention for performing recording and playback of digital data.

Fig. 4 is a diagram showing paths of a signal, which is subject to prohibition of processing, and a medium in the prior scheme.

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Fig. 5 is a diagram showing paths of a signal, which is subject to prohibition of processing, and a medium in accordance with the scheme of this invention.

5 Fig. 6 is an exemplary flow chart for recording/copying control.

Fig. 7 is an exemplary flow chart for playback control.

10 Fig. 8 is a block diagram showing a more detailed configuration of the apparatus for digital watermarking and scrambling.

Fig. 9 is a block diagram showing a more detailed

15 ~~Fig. 10 is a block diagram showing a more detailed configuration of the apparatus for descrambling and detection of additional information.~~

## **PART II. RETAILER'S DESCRIPTION OF THE PREFERRED EMBODIMENT**

20 Fig. 6 shows an exemplary flow chart for recording/copying control. At step 610, digital data such as an MPEG stream is inputted, and at step 620, detection of any electronically embedded additional information is performed. At step 630, it is determined whether or not the additional information is detected, and if not, the stream is passed as it is.

If the determination at step 630 is "YES", then at step 640, it is determined whether or not the additional information is (1,1), and if so, the stream is not passed. At the same time, scrambling or video recording is stopped. If the additional information is not (1,1), then at step 650, it is determined whether or not the additional information is (1,0).

35        If this result is "YES", the stream is passed as it is. If the result of step 650 is "NO", then at step 660, it is determined whether or not the additional information is (0,0). If this result is "YES", then the stream is passed as it is. Otherwise, this means that the additional information is (0,1), which cannot possibly exist in any event and, thus, the additional information is determined to be undefined. Instead of doing this, however, the stream may be prohibited on an assumption that such abnormality has been caused by an

erroneous bit change in the medium or another abnormality that occurred during embedding.

The passed stream is subsequently scrambled for 5 recording the same onto a medium. While said scrambling is a means for enciphering, it may be such scrambling based on an encryption key for improving robustness. Using such scrambling by an encryption key, there is no 10 way to decode the scrambled digital data in the absence of the key and, thus, it becomes possible to distribute the digital contents in a safer manner.

Fig. 7 shows an exemplary flow chart for playback 15 control. At step 710, digital data is inputted, and at step 720, descrambling (decoding) of the scrambled digital data is performed. At step 730, it is determined whether or not the decoding is terminated, and if so, the process proceeds to step 740.

20 If the result at step 730 is "NO", then at step 760, it is determined whether or not another encryption technique such as CSS (Content Scramble System) has been applied. Note here that CSS is a scrambling technique for a read-only disk. If the result at step 760 is 25 "YES", the corresponding decoding process is performed. Otherwise, the present playback is continued.

After performing detection of the additional 30 information at step 740, then at step 750, it is determined whether or not the detection is terminated. If this result is "NO", the process proceeds to step 760. On the other hand, if the result of step 750 is "YES", the process proceeds to step 765.

35 At step 765, it is determined whether the detected additional information is (1,1) or (0,0) or absence of the additional information. If this result is "YES", the playback is continued. On the other hand, if this result is "NO", then at step 770, it is determined whether or 40 not the additional information is (1,0). If this result is "NO", the additional information is deemed to be undefined. However, if this result is "YES", then the process proceeds to step 780. At step 780, it is determined whether or not there exists a copy mark, and 45 if so, the playback is continued. On the other hand, if this result is "NO", then at step 790, a copy mark is added and the playback is continued. In this case, i.e., if the result of step 780 is "NO", the playback may be

alternatively stopped.

Incidentally, in a case where the digital data cannot be correctly descrambled (i.e., the digital data has not been scrambled), it may be alternatively processed as set forth below. For example, if the additional information is (1,0) and there is no copy mark, the stream is stopped and its descrambling or playback is stopped. Also, if the additional information is (1,1) and there is a copy mark, the stream is stopped and its descrambling or playback is stopped. Further, if the additional information is (1,1), the stream is descrambled and/or playback is stopped. Finally, if the additional information is (1,1) or there is no additional information at all, the playback is permitted.

Figs. 2 and 3 show schematic configurations of apparatuses of this invention for performing recording/playback of the digital data. While Fig. 2 shows an application of this invention to a video driver card primarily used in a personal computer in such a manner that a card is separated from a drive, Fig. 3 shows another application of this invention to a digital recorder (recorder) and a digital player (player) as representative electric home appliances in such a manner that a card and a drive are integrated together.

In Fig. 2, there are two different signal flows involved. That is, in the first signal flow, a signal inputted into an STB 210 is fed from an analog output of the STB 210 to a video driver card of a recorder 220. In the second signal flow, detection of additional information, addition of a copy mark and scrambling are performed in STB 210 and, then, the scrambled digital data is directly fed to a drive of the recorder 220.

When an analog signal is inputted to the video driver card, it is converted to digital data by an MPEG encoder such that detection of additional information, addition of a copy mark and scrambling are subsequently performed. The digital data so scrambled is recorded onto a medium by the recorder 220. This medium is then conveyed to a player 230 for its playback. Note that the recorder 220 and player 230 are described herein to be separate machines, but they may be configured as a single machine. The latter approach would be more general than the former.

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5        The medium conveyed to the player 230 is subject to a reading operation. The digital data read from the medium is then inputted to a video driver card such that its descrambling, detection of the additional information and addition of a copy mark (if required) are subsequently performed. Finally, the digital data is decoded by an MPEG decoder.

10      In Fig. 3, there are two different signal flows involved. That is, in the first signal flow, a signal inputted into an STB 310 is fed from an analog output of the STB 310 to a recorder 320. Whereas in the second signal flow, detection of additional information, addition of a copy mark and scrambling are performed in STB 310 and, then, the scrambled digital data is directly fed to a drive of the recorder 320.

20      When an analog signal is inputted to the recorder 320, it is converted to a digital data by an MPEG encoder such that detection of additional information, addition of a copy mark and scrambling are subsequently performed. The digital data so scrambled is recorded onto a medium by a recording device. This medium is then conveyed to a player 330 for its playback. Note that the recorder 320 and player 330 are described herein to be separate machines, but they may be configured as a single machine. The latter approach would be more general than the former.

30      The medium conveyed to the player 330 is subject to a reading operation. The digital data read from the medium is then inputted to a video driver card such that its descrambling, detection of the additional information and addition of a copy mark (if required) are subsequently performed. Finally, the digital data is decoded by an MPEG decoder.

40      Fig. 8 is a block diagram, which shows a more detailed configuration of the recorder 320 or STB adapted for use in digital watermarking and scrambling. Block 810 is an input control circuit block for receiving an MPEG stream and passing the MPEG stream to a stream conversion circuit and an MPEG parser circuit. Block 820 is the MPEG parser circuit block for extracting from the MPEG stream those portions that are required by the next stage. Block 830 is a macro block buffer for storing at least one macro block that is necessary for embedding control information.

Block 840 is a code amount comparison circuit block for calculating and comparing code lengths in a macro block. Block 850 is a code conversion circuit block for converting a code to be used for embedding the control information. Block 860 is a code amount adjustment circuit block for adjusting a code length to be identical to its value before the conversion and for forming the result as an embedding conversion table.

10 Block 870 is a stream conversion circuit block for  
stopping/converting/ passing the MPEG stream as it is  
based on a detected result of additional information.  
15 Block 880 is an accumulation memory for accumulating  
those values of DCT factors derived by the MPEG parser  
circuit that are multiplied by weighting factors. Block  
890 is a table of the weighting factors for correlating  
with additional information contained in the inputted  
MPEG image.

20 Block 892 is a statistical processing circuit block  
for performing statistical processing of the values  
stored in the accumulation memory. Block 897 is a  
detected result determination circuit block for  
25 determining a value of embedded additional information  
from its preceding stage and for issuing an indication to  
the stream conversion circuit. Block 896 is a scramble  
circuit block for performing authentication with a  
recording device and for scrambling such stream that is  
30 found to contain the additional information.

35 Fig. 9 is a block diagram, which shows a more detailed configuration of the player 330 adapted for use in descrambling and detection of the additional information. Block 910 is a descramble circuit block for authenticating an inputted digital signal with a playing device and for descrambling the digital signal. Block 920 is an input control circuit block for receiving the MPEG stream and passing the MPEG stream to a stream 40 control circuit and an MPEG parser circuit.

Block 930 is the MPEG parser circuit block for extracting from the MPEG stream those portions that are required by the next stage. Block 940 is an accumulation memory for accumulating those values of DCT factors derived by the MPEG parser circuit that are multiplied by weighting factors. Block 950 is a table of the weighting factors for correlating with additional information.

contained in the inputted MPEG image.

Block 960 is a statistical processing circuit block for performing statistical processing of the values stored in the accumulation memory. Block 970 is a detected result determination circuit block for determining a value of embedded additional information from its preceding stage and for issuing an indication to the stream control circuit. Block 980 is the stream control circuit for stopping/passing the MPEG stream as it is based on the detected result of additional information.

Fig. 4 shows paths of a signal, which is subject to prohibition of processing, and a medium in the prior scheme in case of only one generation copy is allowed. In a compliant device (a device in accordance with the prior scheme), a compliant source (a source in accordance with the prior scheme) 410 is smoothly processed in a recorder 420 and/or player 430, but no further recording can be performed in recorder 440. Note, however, in this respect that in such an operation combined with a non-compliant device, it is possible to perform an illegal recording/playback operation.

By way of example, if the compliant source 410 is digitally inputted to a recorder 450 in the non-compliant device, it is not only possible to perform its digital recording but also its playback in a player 460. Further, if a digital output of the player 430 in the compliant device is inputted to a recorder 470 in the non-compliant device, it becomes possible to perform its recording as well.

Fig. 5 shows paths of a signal, which is subject to prohibition of processing, and a medium in accordance with the scheme of this invention. In a compliant device (a device in accordance with the scheme of this invention), a compliant source (a source in accordance with the scheme of this invention) 510 is smoothly processed in a recorder 520 and/or player 530, but no further recording can be performed in a recorder 540.

Here, operations combined with a non-compliance device will be considered briefly. First, even if it is intended to digitally input the compliant source 510 to a recorder 550 in the non-compliant device, such inputting is prohibited and, thus, there will be no way to perform

its digital recording. Also, it becomes possible to prohibit inputting of a digital output of the player 530 in the compliant device to a recorder 570 in the non-compliant device.

5

Further, as another embodiment of playback control, for those scrambled contents of a read-only disk such as CSS, its playback may be permitted on a condition that CSS is successfully descrambled. More particularly, if CSS is successfully descrambled, it is possible to avoid detection of any digital watermark.

15 Alternatively, if CSS is successfully descrambled, it is possible to permit playback on a condition that the additional information of (1,1) is detected. Further, by adding a scheme that allows performance of descrambling using proximately detected digital watermarking information and/or additional information as a key, or to perform subsequent descrambling using such digital watermarking information that is detected after the initial descrambling, it is possible to strengthen the protection function of scrambling and yet to cause detection of a digital watermark to be mandatory.

20

25 In order to protect copying of scrambled digital data, by using such scrambling with an encryption key, it becomes possible to disable its playback even though its copying is done. Moreover, for those contents that are not subject to any copyright protection, it is also 30 possible to avoid scrambling and/or embedding additional information therein, and to similarly apply descrambling in such a manner that any information to be displayed within a display unit such as a TV set is scrambled or 35 additional information is detected, without departing the spirit of this invention.

In accordance with this invention, there is provided a method of controlling data copying or playback and an apparatus therefor, which use effectively combined digital watermarking and scrambling techniques. As a result, there is no need to provide an additional information detector in a drive that has severe constraints on its cost and/or space. Further, it becomes possible to prevent a compliant source from being digitally recorded and/or digitally played back at a recorder and/or a player in a non-compliant device respectively.

While the invention has been particularly shown and described with reference to an exemplary preferred embodiment thereof, it will be understood by those skilled in the art that various other changes in the form and details may be made without departing from the spirit and scope of the invention.

5 What is claimed is:

CLAIMS

1. A method of recording digital data onto a medium,  
5 comprising the steps of:  
(a) detecting from digital data any additional  
information electronically embedded therein;  
(b) if said additional information is detected, then  
10 performing access control for the digital data using said  
additional information;  
(c) scrambling the digital data; and  
(d) recording the scrambled digital data onto a medium.

2. The method of claim 1, wherein said step (b)  
15 comprises a step of determining whether copying/recording  
of the digital data is to be stopped or continued.

3. The method of claim 2, wherein said step (b) further  
20 comprises a step of embedding a copy mark into the  
digital data in accordance with a content of said  
additional information.

4. The method of claim 1 wherein said electronically  
25 embedded additional information comprises such additional  
information that is embedded through a transformation of  
the data itself.

5. A method of performing playback control of digital  
data recorded onto a medium, comprising the steps of:  
30 (a) descrambling scrambled digital data;  
(b) detecting from the digital data any additional  
information and copy mark electronically embedded  
therein; and  
(c) performing playback control of the digital data using  
35 said additional information and copy mark.

6. The method of claim 5, wherein said electronically  
40 embedded additional information comprises such additional  
information that is embedded through a transformation of  
the data itself.

7. A video driver card for creating digital data, comprising:

45 (a) an encoder for receiving analog data and outputting digital data;

(b) means for detecting any additional information electronically embedded in the digital data;

(c) means for adding a copy mark to said additional information in accordance with said additional information; and

50 (d) means for scrambling the digital data with said additional information.

55 8. The video driver card of claim 7, wherein said  
digital data is an MPEG stream, and wherein said encoder  
is an MPEG encoder.

9. The video driver card of claim 7, wherein said electronically embedded additional information comprises such additional information that is embedded through a transformation of the data itself.

10. A video driver card for decoding digital data, comprising:

65       (a) means for descrambling scrambled digital data;  
          (b) means for detecting from the digital data any  
          additional information and copy mark electronically  
          embedded therein; and  
70       (c) means for performing playback control of the digital  
          data using said additional information and copy mark.

11. The video driver card of claim 10, wherein said digital data is an MPEG stream, and wherein said means (c) comprises means for determining whether or not outputting of an MPEG stream is to be performed and for outputting a desired MPEG stream.

12 The video driver card of claim 10, wherein said  
80 electronically embedded additional information comprises  
such additional information that is embedded through a  
transformation of the data itself.

13 The video driver card of claim 10, wherein said means  
(c) further comprises means for adding a copy mark to the  
85 digital data in accordance with said additional  
information and copy mark and for outputting the digital  
data.

90 14. A recorder for recording digital data onto a medium,  
comprising:  
(a) an encoder for receiving analog data and outputting  
digital data;  
(b) means for detecting any additional information  
electronically embedded in the digital data;  
95 (c) means for adding a copy mark to said additional  
information in accordance with said additional  
information; and  
(d) means for scrambling the digital data; and  
(e) means for recording the scrambled digital data onto a  
100 medium.

105 15. The recorder of claim 14, wherein said digital data  
is an MPEG stream, and wherein said encoder is an MPEG  
encoder.

110 16. The recorder of claim 14, wherein said  
electronically embedded additional information comprises  
such additional information that is embedded through a  
transformation of the data itself.

115 17. A player for playing back digital data recorded onto  
a medium, comprising:  
(a) means for reading the digital data from the medium;  
(b) means for descrambling the digital data;  
(c) means for detecting from the digital data any  
additional information and copy mark electronically  
embedded therein; and  
(d) means for performing playback control of the digital  
data using said additional information and copy mark.

120 18. The player of claim 17, wherein said digital data is  
an MPEG stream, and wherein said means (d) comprises  
means for determining whether or not outputting of an  
MPEG stream is to be performed and for outputting a  
desired MPEG stream.

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130 19. The player of claim 18, wherein said means (d)  
further comprises means for adding a copy mark to the  
digital data in accordance with said additional  
information and copy mark and for outputting the digital  
data.

135 20. The player of claim 17, wherein said electronically  
embedded additional information comprises such additional  
information that is embedded through a transformation of  
the data itself.

## ABSTRACT

## METHOD AND APPARATUS FOR CONTROLLING DIGITAL DATA

5

## ABSTRACT

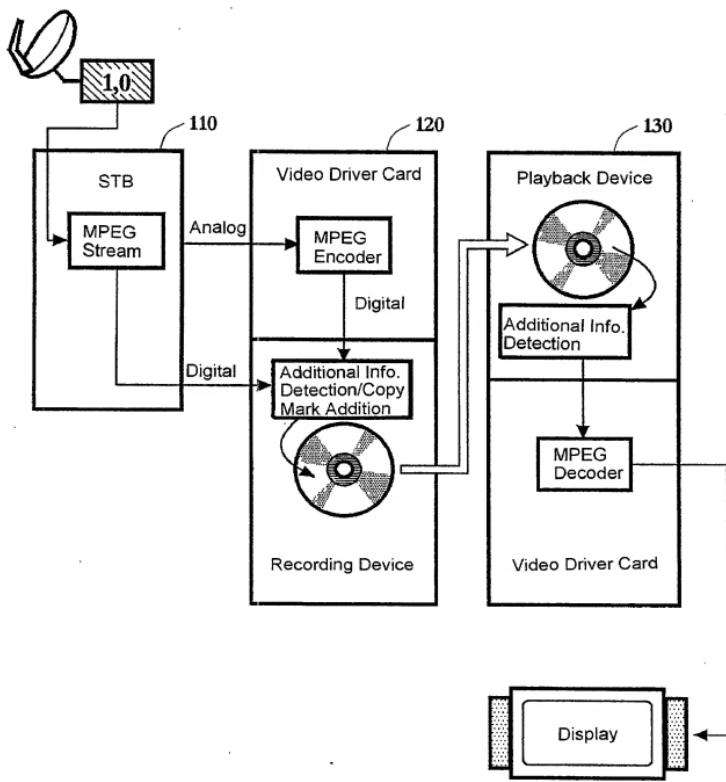
Data copying or playback is controlled, which does not require an additional information detector in a drive that has severe constraints on its cost and/or space.

10 For recording control digital data, any additional  
information electronically embedded therein is detected  
and, if such additional information is detected, then  
access control of the digital data is performed using the  
additional information. Next, the digital data is  
15 scrambled for recording the same onto a medium. Note  
that the term "electronically embedded additional  
information" means herein such additional information  
that is embedded through a transformation of the data  
itself. Also, the term "access control" means herein to  
20 determine whether copying/recording of the digital data  
is to be stopped or continued. Depending on the content  
of the additional information, the term "access control"  
also embraces embedding control information such as a  
copy mark into the digital data. For the playback  
25 control, the scrambled digital data is descrambled,  
thereby to detect any electronically embedded additional  
information and copy mark from the descrambled digital  
data. Using such detected information, playback control  
of the digital data is performed.

30

[Document Type] Drawing

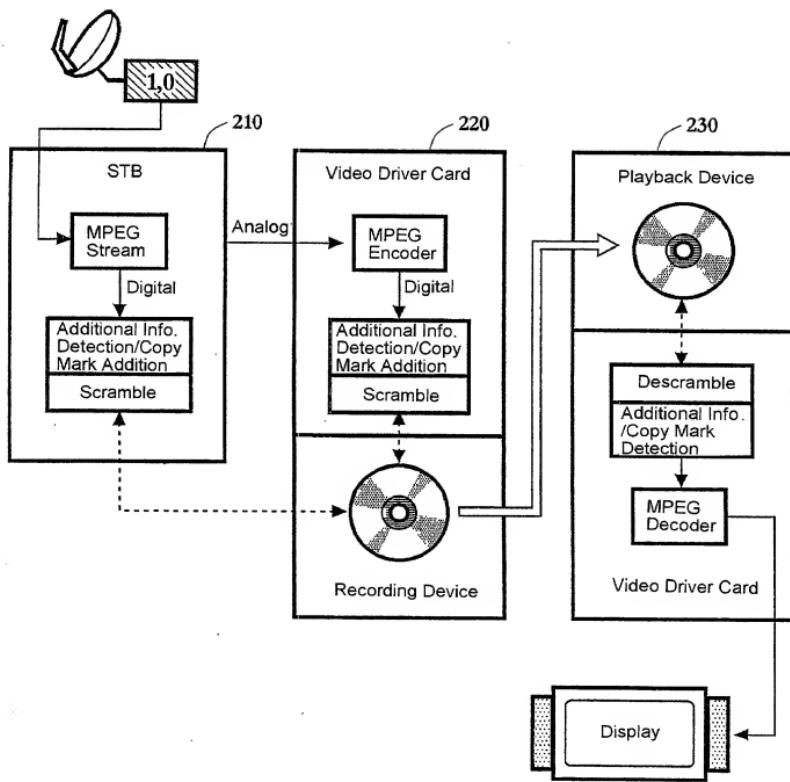
[Figure 1]



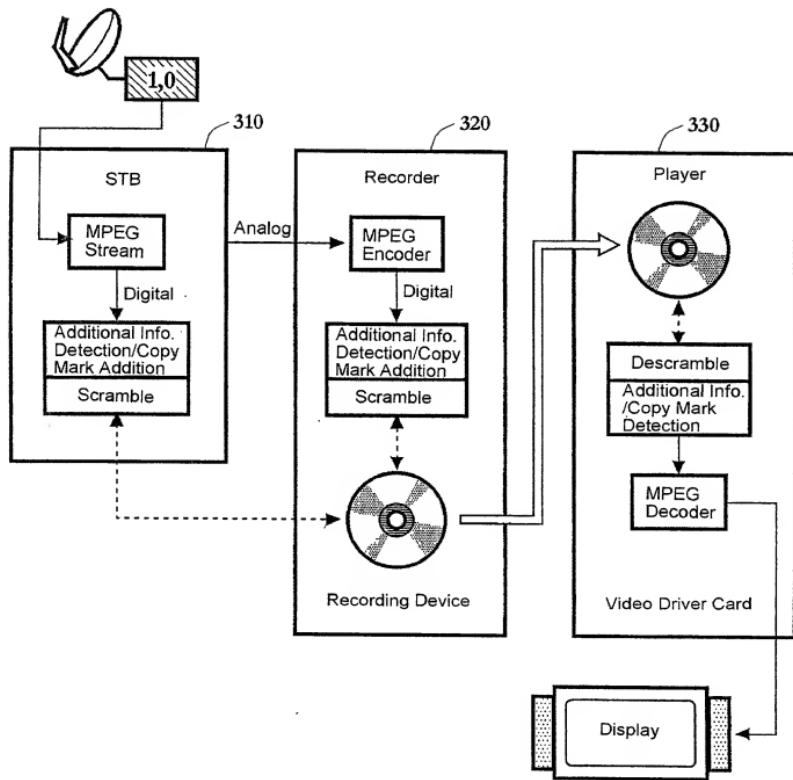
652744-4119265160

[Figure 2]

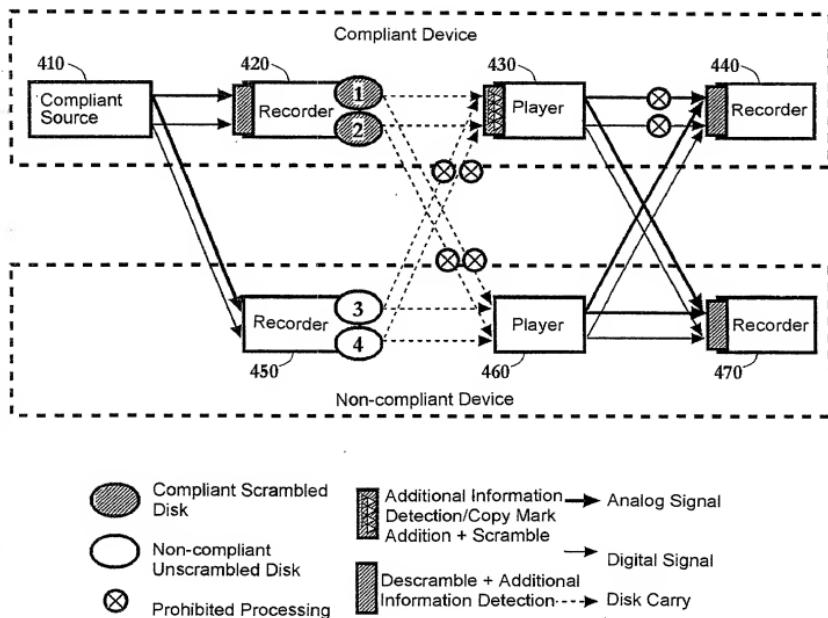
01032694 200209



[Figure 3]

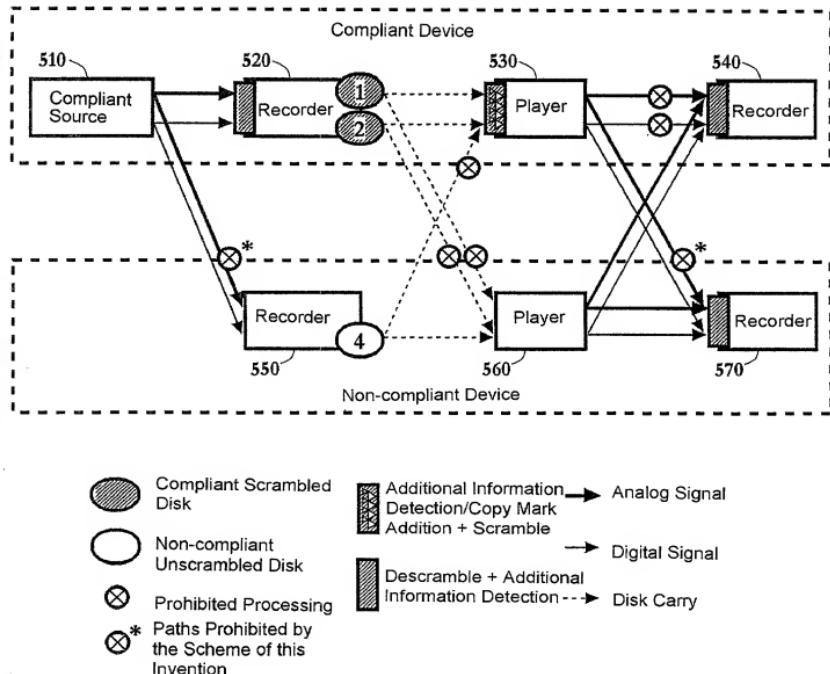


[Figure 4]

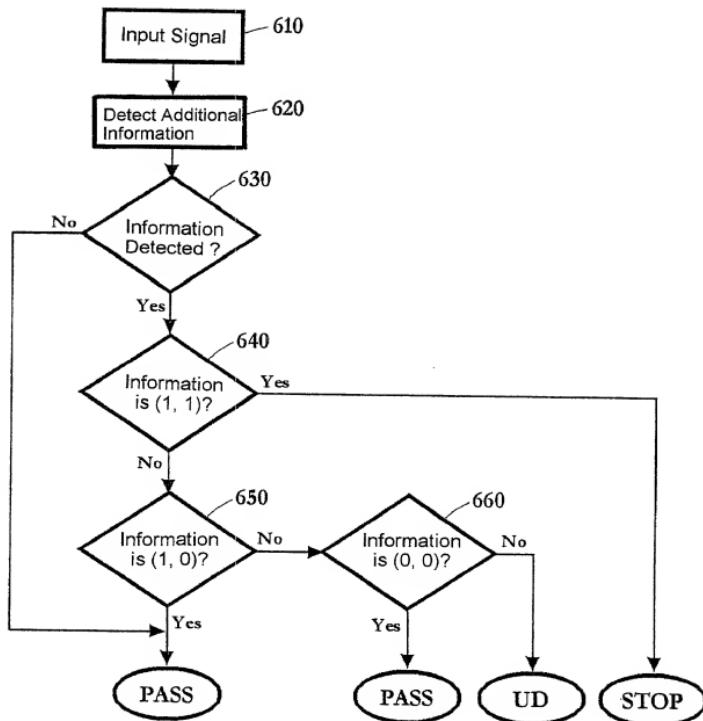


[Figure 5]

602774-1926560



[Figure 6]

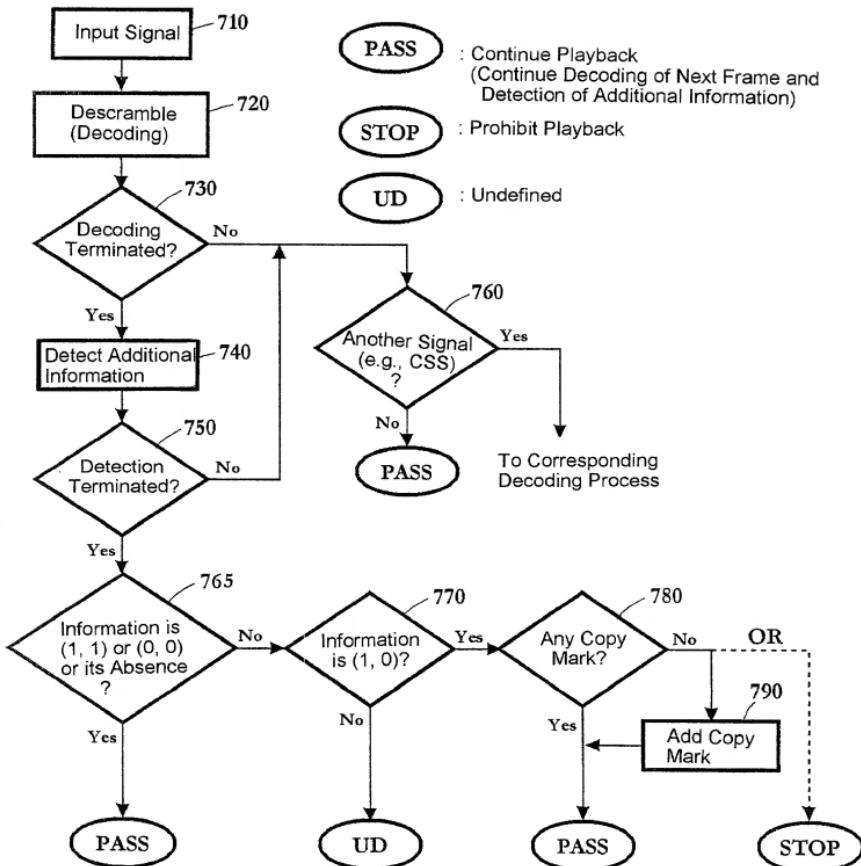


**PASS** : Continue Copying Process

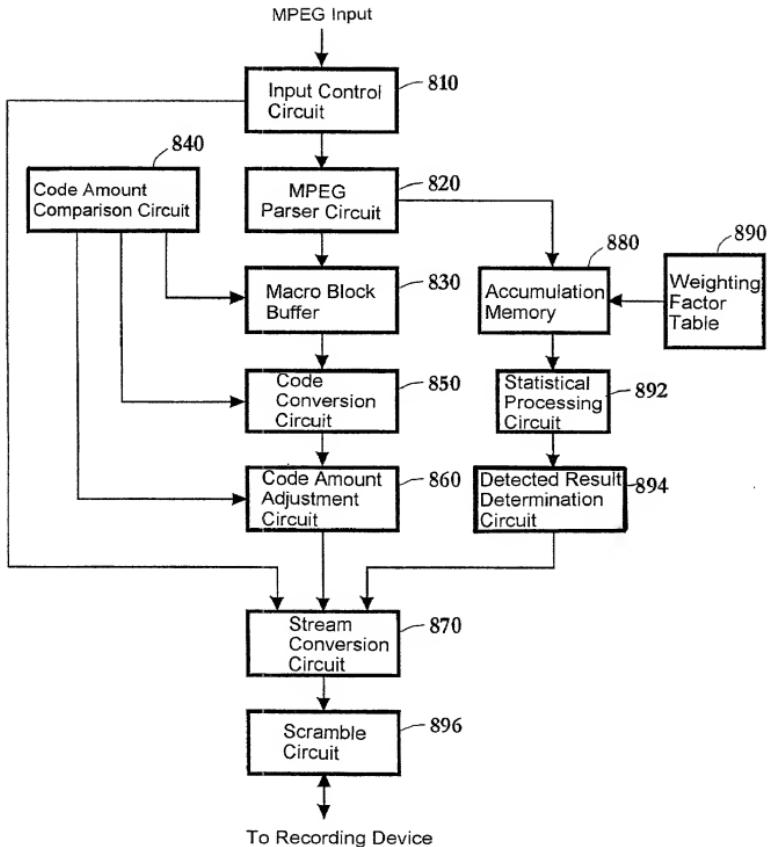
**STOP** : Prohibit Copying Process

**UD** : Undefined

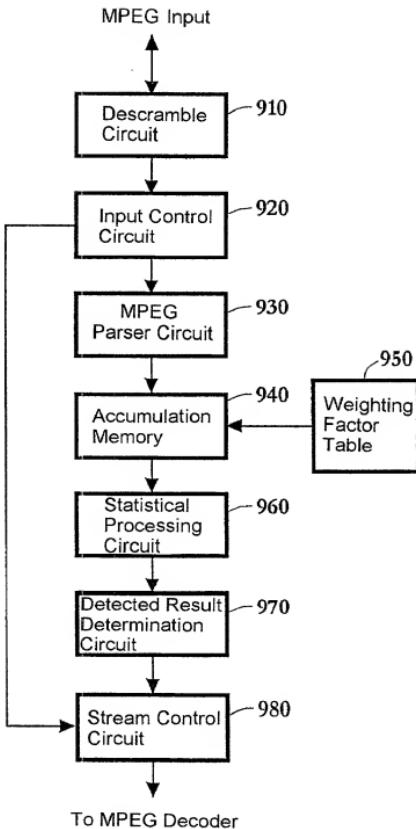
[Figure 7]



[Figure 8]



[Figure 9]



602TTT-1192626160

Declaration and Power of Attorney for  
Patent Application

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

**METHOD AND APPARATUS FOR CONTROLLING DIGITAL DATA**

the specification of which (check one)

is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

Number	Country	Day/Month/Year	Priority Claimed
10-324169	Japan	11/13/1998	Yes

I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, 112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U.S. Applications:

Serial No.	Filing Date	Status
N/A		

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: Christopher A. Hughes, Reg. No. 26,914; Edward A. Pennington, Reg. No. 32,588; Joseph C. Redmond, Jr., Reg. No. 18753; John E. Hoel, Reg. No. 26,279, Francis A. Sirr, Reg. No. 17,265, Earl C. Hancock, Reg. No. 19,472, William W. Cochran, Reg. No. 26,652, John R. Wahl, Reg. No. 33,044, and Robert G. Crouch, Reg. No. 34,806.

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PATENT

Client/Matter No. JA9-98-171  
Atty. Docket No.

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